

**P-4.5 Analyze the relationships among voltage, resistance, and current in a complex circuit by using Ohm's law to calculate voltage, resistance, and current at each resistor, any branch, and the overall circuit.**

**Revised Taxonomy Level 4      Analyze conceptual knowledge**

**Key Concepts**

Ohm's law

In physical science students used Ohm's law to calculate voltage, current or resistance, but they did not look at these relationships in terms of multiple resistors or an entire circuit.

**It is essential for students to**

- ❖ Draw circuit diagrams from a verbal description of a circuit
- ❖ Use Ohm's Law to determine the current, voltage or resistance at any resistor, across any branch or in the entire circuit in both series and parallel circuits.

**Traditional course differentiation**

- ❖ Use Ohm's Law to determine the current, voltage or resistance at any resistor, across any branch or in the entire circuit for complex network circuits.

**Assessment**

The revised taxonomy verb for this indicator is analyze which means to “break material into its constituent parts and determine how the parts relate to one another and to an overall structure or purpose”. In this case, students should be able to look at an entire circuit and determine the voltage, current, and resistance of the parts based on the orientation of the resistors. Because the indicator is written as conceptual knowledge, assessments should require that students understand the “interrelationships among the basic elements within a larger structure that enable them to function together.” In this case, assessments must show that students understand the reasons for the difference in the way that the variables are measured in the two types of circuits based on their knowledge of current flow in the two circuits.